REMARKS/ARGUMENTS

Applicant thanks Examiner for the detailed Office Action dated August 16, 2006. In response to the issues raised, the Applicant offers the following submissions and amendments.

Amendments

Independent claims 1, 19 and 38 have been amended to highlight the features distinguishing them from the cited art. As a result of these amendments, claims 3, 21 and 40 have been cancelled. Independent claims 1, 19 and 38 have also been amended to define the small heater to nozzle spacing used in the present invention for greater ejection efficiency. The heater to nozzle spacing and its impact on printhead efficiency is described at page 20, line 25 to page 21, line 20.

Accordingly the amendments do not add new matter.

Specification

Claims 9, 28 and 45 have been objected to for lack of antecedent in the specification. The Applicant respectfully disagrees. The section of the Detailed Description entitled "Self-cooling of the printhead" at line 22 of page 21 clearly describes the claimed subject matter. While the text of the claims has not been repeated in the description, the state of thermal energy balance to which the claims are directed is comprehensively discussed in this sub-section of the description. We submit that the ordinary worker would immediately recognize this section of the description as the basis for the matter claimed in claims 9, 28 and 45.

Claims – 35USC§103

Claims 1, 19 and 38 *inter alia* stand rejected as obvious in light of US 6,019,457 to Silverbrook in view of US 4,870,433. Amended claims 1, 19 and 38 incorporate the features of now canceled claims 3, 21 and 40. Claims 3, 21 and 40 were rejected as obvious in view

of '457 and '433 as applied to claims 1, 19 and 38, in further view of US 6,680,668 to Gerber et al. To further distinguish the invention, amended claims 1, 19 and 38 also define the close spacing of the bubble nucleating regions and the nozzle aperture.

Skilled workers will appreciate that the drop of ejctable liquid ejected from the nozzle will come from the layer of liquid between the bubble nucleating regions and the nozzle aperture. By keeping this layer of liquid thin, that is, by keeping the spacing between the nucleating regions and the nozzle small, the mass of liquid displaced by the bubble is less and so less energy needs to be applied to the bubble formation. However, drop misdirections from bubble irregularities are emphasized when the heater is close to the nozzle. The invention addresses this with the lateral spacing of the bubble nucleating regions.

The nucleation regions are laterally offset from the central axis of the nozzle, each region being offset an equal and opposite distance to eachother. The nucleation regions are also close enough that their respective bubbles grow until they coalesce into one and eject the liquid. A single heater element with controlled bubble nucleation on either side of the central axis generates a broad bubble that shapes the pressure pulse so that droplet misdirection is reduced.

None of the cited references disclose the suspension of the laterally spaced bubble nucleation regions less than 50 microns under the nozzle aperture. Nor do they recognize the efficient operation and accurate drop trajectories available to printhead constructed in accordance with the invention. Accordingly, amended claims 1, 19 and 38 are not an obvious derivation from the teachings of '457, '433 and '668.

Conclusion

It is respectfully submitted that the Examiner's objections and rejections have been successfully traversed. Accordingly, favorable reconsideration is courteously solicited.

Very respectfully,

Applicant/s:

Kia Silverbrook

C/o: Silverbrook Research Pty Ltd
393 Darling Street
Balmain NSW 2041, Australia

Email: kia.silverbrook@silverbrookresearch.com
Telephone: +612 9818 6633
Facsimile: +61 2 9555 7762